Claims

[1] A phosphor having the chemical formula: Sr4-XMgγBaZSi2O8:Eu^{2+} X (0<x<1, 0<y<l, 0≤z<l).

[2] The phosphor of claim 1, wherein the average particle size of the phosphor is less than 20mm.

[3] The phosphor of claim 1, wherein the average particle size of the phosphor is 5 to 15mm.

[4] The phosphor of claim 1, wherein the phosphor is excited by the light generated from a compound semiconductor to have a main peak ranging from 500 to 600nm.

[5] The phosphor of claim 1, wherein the phosphor is excited by the light having a main peak ranging from 400 to 480nm to have a main emission peak ranging from 500 to 600nm.

[6] The phosphor of claim 1, wherein a main emission peak of the phosphor shifts according to the concentration of Eu^{2+}.

[7] The phosphor of claim 1, wherein the mole concentration of Eu^{2+} is 0.02 to 0.20 mol.

[8] A light emitting device including a phosphor, comprising:
a light source;
a support for supporting the light source;
a light transmitting member provided at least one portion around the light source; and
a phosphor having a chemical formula: Sr4-XMgγBaZSi2O8:Eu^{2+} X (0<x<l, O≤y≤1, O≤z≤1) incorporated in the light transmitting member.

[9] The light emitting device of claim 8, wherein the concentration of Eu^{2+} is 0.02 to 0.20 mol.

[10] The light emitting device of claim 8, wherein the light transmitting member is a molding member.

[11] The light emitting device of claim 8, wherein the mixing ratio of the phosphor with respect to the light transmitting member is 5 to 50 wt%.

[12] The light emitting device of claim 8, wherein the light transmitting member is molded entirely around the light emitting device.

[13] The light emitting device of claim 8, wherein the light transmitting member is molded partially around the light emitting device.

[14] The light emitting device of claim 8, wherein white light is emitted by the light emitted from the light source and the light excited by the phosphor.

[15] The light emitting device of claim 8, wherein the concentration of Eu^{2+} included

in the phosphor is 0.02 ъ 0.20 mol.

[16] The light emitting device of claim 8, wherein in a case where the light emitting device is a top view type, the concentration of Eu^{2+} is 0.02 to 0.10 mol.

[17] The light emitting device of claim 16, wherein the content of the phosphor with respect to the light transmitting member is 10 to 30 wt%.

[18] The light emitting device of claim 8, wherein in a case where the light emitting device is a side view type, the concentration of Eu^{2+} included in the phosphor is 0.08 to 0.15 mol.

[19] The light emitting device of claim 18, wherein the content of the phosphor with respect to the light transmitting member is 5 to 20 wt%.

[20] The light emitting device of claim 8, wherein in a case where the light emitting device is used as a white light source of a backlight, the concentration of Eu^{2+} included in the phosphor is 0.02 to 0.10 mol, and the content of the phosphor with respect to the light transmitting member is 15 to 50 wt%.

[21] The light emitting device of claim 8, wherein in a case where the light emitting device is used as a blue light source of a backlight, the concentration of Eu^{2+} included in the phosphor is 0.02 to 0.10 mol, and the content of the phosphor with respect to the light transmitting member is 10 to 40 wt%.

[22] The light emitting device of claim 8, wherein the light source is a gallium nitride light emitting diode.

[23] A lamp type light emitting device including a phosphor, comprising:
a light source;
a support for supporting the light source;
a molding member provided at least one portion around the light source; and
a phosphor having a chemical formula: Sr4-XMgγBaZSi2O8:Eu^{2+}X (0<x<l, O≤y≤1, O≤z≤1) incorporated in the molding member.

[24] A surface mounting type light emitting device including a phosphor, comprising:
a light source;
a support for supporting the light source;
a molding member provided at least one portion around the light source; and
a phosphor having a chemical formula: Sr4-XMgγBaZSi2O8:Eu^{2+}X (0<x<l, O≤y≤1, O≤z≤1) incorporated in the molding member.

[25] A method for producing a phosphor, comprising the steps of:
providing the stoichiometric quantities of an oxygen compound of at least one element selected from the group consisting of strontium (Sr), magnesium (Mg) and barium (Ba) and an oxygen compound of europium;
mixing the oxygen compounds; and
thermally treating the mixture to convert the same into a silicate phosphor

including europium activated with rare earth ions.

[26] The method of claim 25, further comprising the step of adding at least one fluxing compound selected from the group consisting of boride, chloride and fluoride after the oxygen compounds are mixed.

[27] The method of claim 25, wherein the oxygen compounds are mixed using a small amount of solvent selected from the group consisting of distilled water, alcohol and acetone, and then dried at 100 to 400℃.

[28] The method of claim 25, wherein the thermal treatment step is carried out under a mixture gas atmosphere of nitrogen and hydrogen, and the volume ratio of nitrogen and hydrogen is preferably 75 to 98:25 to 2.

[29] The method of claim 25, wherein the thermal treatment step is carried out at 800 to 1500℃.